# Enabling large focal plane arrays through mosaic hybridization

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We have demonstrated the hybridization of large mosaics of far-infrared detectors, joining separately fabricated sub-units into a single unit on a single, large substrate. We produced a single detector mockup on a 100mm diameter wafer and four mockup readout quadrant chips from a separate 100mm wafer. The individually fabricated parts were hybridized using a Suss FC150 flip chip bonder to assemble the detector-readout stack. Once all of the hybridized readouts were in place, a single, large and thick silicon substrate was placed on the stack and attached with permanent epoxy to provide strength and a Coefficient of Thermal Expansion (CTE) match to the silicon components underneath. Wirebond pads on the readout chips connect circuits to warm readout electronics; and were used to validate the successful superconducting electrical interconnection of the mockup mosaic-hybridized detector. This demonstration is directly scalable to 150 mm diameter wafers, enabling pixel areas over ten times the area currently demonstrated.

## 100 word version

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